# Nanoparticle Amplified High Sensitivity Multiplexed Lateral Flow Microarray Test Strip Assay for Waterborne Pathogens

Srivatsa Venkatasubbarao
Intelligent Optical Systems, Inc., Torrance, CA

Washington, DC | U.S. EPA SBIR Phase I Kick-Off Meeting | April 5–6, 2007

## Problem Statement

The World Health Organization has reported that infectious diseases are the main source of mortality in humans, and many infectious diseases are caused by waterborne pathogens.

There is a critical need to develop cost-effective and easy-to-use sensors to accurately and simultaneously detect multiple pathogens at high sensitivity, in water.

Portable detection systems that can be easily used by semiskilled personnel to identify the presence of pathogens are not available.

## Technology Description

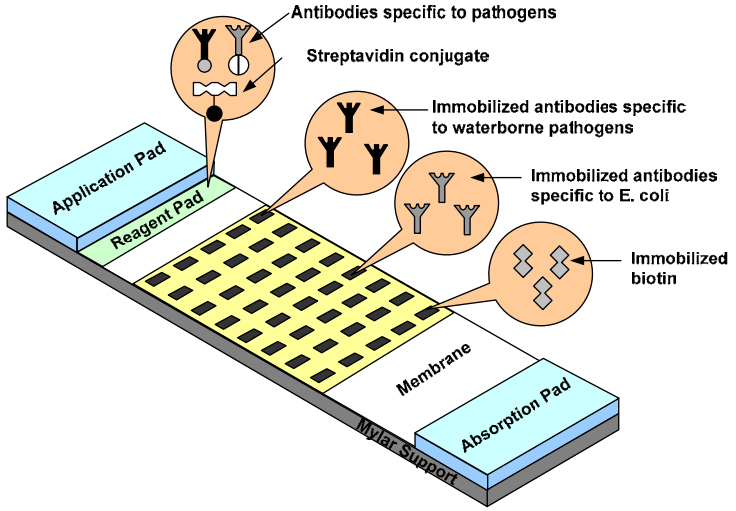
A drop of the sample containing pathogens is applied on the test strip. The sample is transported across the membrane, and reacts with the reagents on the test strip. The reagents bind to the spots on the microarray. Reagents that emit at different wavelengths are used to ensure that any cross reactivity or nonspecific binding to the microarray can be identified. The signals at each spot are measured. This improves the specificity and increases the suitability of the multiplexed field test strips. The signal is measured with a portable reader, and the signal intensity is related to the pathogen concentration in the sample. The right side of the figure shows the reader components.

## Expected Results

- Lateral flow test strips for multiple pathogen detection
- An optical detection system to read the results from the test strips
- Test results demonstrate that the proposed device is suitable for detecting multiple pathogens

## Potential Environmental Benefits

- Field test kit for environmental monitoring for pathogens and toxigenic species
- Simultaneous detection of multiple waterborne pathogens
- Sensors for monitoring multiple waterborne pathogens at high sensitivity in drinking water processing facilities across the United States
- Agricultural applications (for example, to analyze food safety), as well as medical and military applications




This research is funded by USEPA SBIR Program, Contract #EP-D-07-031